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THE JOURNAL OF PHILOSOPHY

FICTIONS IN SCIENCE AND PHILOSOPHY. II[1]

ONE of the most confusing fictions in modern thought is experience conceived as a substantive. Philosophers have engaged in endless dialectic about the world being a part of our experience, without defining the relation in empirical terms. Anything may be said to be part of our experience when we are interested in it, whether it be another organism or the Milky Way. But we must make clear what we mean by experience. It is evident that experience presupposes what Bertrand Russell calls mnemic causation, i.e., the cumulation of action as habit and memory. It has no meaning to say that a stone has experience of the ground upon which it rests or that chemical elements have experience of the synthesis or analysis which they undergo. I can not, therefore, accept A. N. Whitehead's generalization: "The direct evidence as to the connectedness of one's immediate present occasion of experience with one's immediately past occasions can be validly used to suggest categories applying to the connectedness of all *occasions in nature*."[2] I am obliged to translate Whitehead's statement into our common vernacular. We are organisms characterized by mnemic causation. By habit and memory we conserve our behavior in such a way that we can refer backward to events which are no longer perceptually present and, since we are conative organisms, having instincts and desires, we can by means of imagination anticipate future events. Can we generalize from *our* experience of nature to a similar connectedness in nature's activities everywhere? Obviously not, unless we can find analogies to our behavior in the actions of all other parts of nature. Animals, we find, can profit by experience. Even protozoa have been shown by Jennings to establish habits of acting, at any rate temporarily. So far as I know, there is no similar evidence in plant life; and there is no evidence of such mnemic causation in the inorganic world. On the contrary, no matter what syntheses chemical elements have passed through, they react in new syntheses as though

[1] Continued from preceding issue, pp. 673–682.

[2] *Adventures in Ideas*, p. 284.

they had not previously been part of any synthesis. That is a postulate of chemistry.

The trick lies in the phrase, "occasion of experience." There are occasions of *experiencing* or *having experience of* events acting upon our organism. Experience is not a substantive. There are no occasions of experience. There is no continuum of experience. Whether there is a continuum of *experiencing* is another question. We have a succession of occasions of experiencing events. And we have experience of a great variety of simultaneous events. But whether, temporally or spatially, we can prove a continuum, in either a mathematical or metaphysical sense, is doubtful. The quantum character of nature makes such a supposition improbable.

Whitehead implies the substantival conception of experience in his grades of "occasions of experience" of which human nature is an extreme instance.[3] We can grade individuals on some basis, such as complexity. But individuals are not occasions of experience but occasions of experiencing other individuals. The grades are not based on the experiencing but on the character of the individuals. There is no stuff of experience out of which individuals are constituted. Experiencing is a relation, not a substantive. It is the substantival conception of experience which makes the relation of experience to its world so mysterious for Whitehead: "The world within experience is identical with the world beyond experience, the occasion of experience is within the world and the world is within the occasion. The categories have to elucidate this paradox of the connectedness of things: the many things, the one world without and within."[4] The paradox is of Whitehead's own making. It disappears if we view experience as relational or prepositional (to use J. Loewenberg's expression) instead of as substantival. We, as organisms, with mnemic causation, have experience *of* a variety of things, under a variety of conditions. The world is in our experience in the sense that the world enters into relation to our organisms; or, conversely, that our organism establishes relations to the world in the way of perception and interpretation. In this sense, we can say that the structure of the world becomes immanent in our organism and the structure of our organism becomes immanent in the world as selected by our interest. In other words, in our cognitive and emotional reaction to the world, both the world and the organism enter as factors. The reaction of our organism to the world, in experiencing the world in a certain specific relation, throws important light on the nature of the world in that selected relation. Whether it throws light on the nature of

[3] *Ibid.*, p. 237.
[4] *Ibid.*, p. 293.

the world elsewhere depends upon whether analogous conditions exist. What the world is to the selective reaction of our organism, with its sense organs and the epicritic reaction of its cerebrum, can not be used to explain what the world is to a jellyfish which lacks our organization; still less can it be used to explain the relation of tides to the action of the moon. Nature reveals itself in *specificities*. We can not generalize from a specific relation to nature in general. Experiencing is a specific relation and has no meaning when the specific conditions are lacking. You can not say that because water is wet, therefore its constituents, hydrogen and oxygen, must be wet. It would be a mistake to drink them in order to satisfy your thirst.

Whitehead is anxious to avoid dualism in nature: "Any doctrine that refuses to place human experience outside of nature must find in the description of experience factors which enter also into the description of the less specialized natural occurrences. If there be no such factors, then the doctrine of human experience as a fact within nature is a mere bluff, founded upon vague phrases whose sole merit is a comforting familiarity. We should either admit dualism at least as a provisional doctrine, or we should point out the identical elements connecting human experience with physical science."[5] Using experience in a substantival sense, Whitehead thinks he can arrive at a knowledge of nature in its simpler forms by abstracting from the complexity with which it enters into human experiencing of it. This method of abstraction is illustrated in his conception of energy: "The notion of physical energy, which is at the base of physics, must then be conceived as an abstraction from the complex energy, emotional and purposive, inherent in the subjective form of the final synthesis in which each occasion completes itself."[6] Whitehead is, no doubt, right that we can not separate man from nature. We can understand man only in his reactions to nature (including other men); and we have no other key to nature than the way it reveals itself in its relation to human nature, perceptual and rational. We naturally think of man as the most satisfactory revelation of nature's potentialities. Our emotional and purposive reactions to nature furnish, no doubt, a revelation of nature in those relations, since we are part of nature. They indicate a community of human nature with nature on that level. But only on that level. We must not neglect the specificity of nature. We can not say that "the notion of physical energy . . . must be conceived as an abstraction from the complex energy, emotional and purposive, inherent in the subjective form of the

[5] *Ibid.*, p. 237.
[6] *Ibid.*, p. 239.

final synthesis in which each occasion completes itself." There is no energy in general any more than there is experience in general. There are only energies, and they are reactions in specific conditions. And the specific conditions of emotional and purposeful reactions are rare in our world. The relations of nature are creative or emergent. We can not get the simpler relations by abstracting from the more complex. That is going back to Aristotelian logic: you keep peeling off essences until you get to the core that you want. But the world is not an onion. We must recognize emergent discontinuities in nature. We can know the level with which physics deals in a merely external way for purposes of prediction. We can not assimilate it to the energy relations of our organism with nature, because emotions and purposes, as we know them, have no meaning on the physical level.

Whether we can escape dualism (or pluralism) in metaphysics is an empirical question, depending upon the way we are obliged to react to our world. But dualism on the epistemological level is inescapable, so long as we are trying to cognize our world. There must always be the effort to assimilate the evidence of the larger world into the context of our interpretation. And that effort will always persist so long as we think about our world. The only way to transcend thinking is mysticism, into which F. H. Bradley finally found an escape; and, as I understand Whitehead, he agrees with Bradley's final solution. If I have used Whitehead as a type in discussing the concept of experience, it is because he is the most influential representative at present of the view which I am combatting.[6a]

The concept of consciousness, closely related to the concept of experience, has been, if possible, even more confused. Consciousness has sometimes been used as a substantive. Some philosophers and psychologists have spoken of facts or processes *of* conscious-

[6a] Experience is a key word in the various kinds of pragmatism. But there has been a tendency to confuse epistemology with metaphysics, i.e., the methods of knowing with the ways of existence. To ilustrate: we are told by William James that "ideas lean on experience but experience leans on nothing but itself." What he probably meant is that our ideas are verified by experience and that experience is the final criterion. In other words, experience is relational. Using *experience* in the singular gives the illusion of something substantival. What we really deal with are *experiences of*. Because of John Dewey's Hegelian background, his early writings tend to use experience as substantival. In *Experience and Nature*, his most metaphysical work, he keeps shifting from the relational to the substantival use of experience, and such shifting gives a certain elusiveness to his meaning. In his latest work, *Logic*, he consistently uses experience in a relational sense. The above ambiguity is not found in C. S. Peirce, who is a consistent realist.

ness or as being *in* consciousness, as though consciousness were a general receptacle. Those who have used consciousness in this substantival sense have generally made consciousness synonymous with mind. They speak of facts as being in the mind. For some philosophers, being in consciousness or in the mind carries the implication that this relation establishes a sort of magic circle, making the facts subjective and excluding any reference to anything outside consciousness or mind. I shall not go into the dialectical subtleties of this argument for epistemological idealism. The only operational meaning which I can see in the phrase "in consciousness" or "in the mind" is: being attended to or being part of an interest. And we know that we can be interested in other facts beside mental. The geologist gets very much interested in rocks. The rocks do not enter his mind in any other sense than that he attends to them.

The identification of consciousness with mind was fashionable before Freud. But the discovery that a great deal of what we have been accustomed to associate with mind—impulses, desires, feelings—may belong in the realm of the unconscious (so far as the ordinary waking personality is concerned) has made it awkward to identify consciousness with mind. It entails speaking of unconscious consciousness. It is like speaking of square circles, though the usage still persists in books on philosophy. Philosophic usage is very conservative.

Other philosophers and psychologists have rebelled against the substantival use of consciousness. Some have insisted that consciousness is an epiphenomenon, meaning that consciousness is something in addition to the causal processes of the organism. But they have been very vague. They have not defined what this additional entity could be. They seem to mean that all that is strictly psychological—feelings, ideas, volitions—has nothing to do with the go of the organism: the activity of the organism must be conceived in strictly material terms. But this is assuming what they should prove. Some concede that the psychological facts run parallel to the physiological processes in a one-to-one correspondence. But no one has tried to show how such a relation could exist. Epiphenomenalism and parallelism belong in the world of fiction. They have no operative significance.

What has been neglected by philosophers is to try to arrive at the operational significance of consciousness. In order not to be confused by language, let us substitute awareness for consciousness. That substitution is made by G. E. Moore, who has given a great deal of attention to the place of consciousness. He suggests, however, other substitutions, such as knowing and experience.

These are by no means equivalent to awareness. Knowing and experiencing entail mnemic causation. But we can speak of the magnetic needle as being aware of or sensitive to the presence of a lodestone. In Lotze's language, we can speak of the elements in a chemical synthesis as being aware of or taking account of one another in their spatial and temporal relations. But we can not speak of the magnet or the chemical elements as experiencing or knowing. Awareness is not limited to such psychological processes as knowing or experiencing. We can see that in our own life. I am aware of the pressure of my clothes when I am not attending to that pressure. This can be proved by the fact that I become aware of a sudden change of pressure as a change. At any moment of my life, I am aware of multitudinous sensory processes to which I do not attend and of which I, therefore, can not be said to have knowledge or experience. The telephone may ring but I am too occupied by my problem to notice it, though, perhaps, later the noise overcomes my inertia and I come to the realization that the telephone is ringing or has just rung. Awareness, then, is not limited to meaningful reaction, as knowing is.

Let us take G. E. Moore's illustration—the "sensation" of blue. In the first place, there is no such fact, operationally speaking, as a sensation. No one ever observed a sensation. Sensation is a fiction of philosophers and psychologists. My organism has sensory awareness of a blue something. I can not say that my primary awareness is of a blue *quality*. The young baby can not be aware of the blue *quality* of an object. Physiologically, its brain probably does not have the epicritic organization to react to definite localized awareness. It can not even focus its eyes. Psychologically, it does not have the experience to enable it to abstract the blue quality from its milieu. Such discrimination and abstraction requires language. Doubtless, it is aware of blue light, if it has functional cones, but we can not say that it is aware of a quality of blue. We may say that it is aware of a blue environment, though it has not as yet differentiated a blue quality. In William James's language, it would come nearer the facts to say that, in its first experience, the baby *is* the blue awareness.

I am trying to get at the primary awareness, without bringing in mnemic causation, as knowing does. We do not have to go back to babyhood to find such awareness. It is the awareness we have of the part of the field to which we do not attend and which, therefore, is not meaningful, though, as gestalt psychology shows, it contributes to the total awareness. What rôle does awareness play in the awareness of something blue? Let us first see what the total situation is when I see something blue. External to the organism

there is the stimulus of physical light of a certain wave length. Physiologically, there is the apparatus of the eye camera, or two eye cameras, which in a few weeks of the baby's life function automatically as one. There are certain changes in the film of rods and cones. This excitement is carried by the optic nerve and is communicated, through the lower ganglia, to the occipital region of the cerebrum; but, in sensing a patch of the environment, the cerebrum as a whole is involved. It is only through this whole action that we have epicritic awareness of location, grades of intensity, and rhythm. The awareness of a portion of blue environment involves this total cerebral reaction. Mnemic causation may not be brought into play, and is not brought into play when we are not attending to the awareness, i.e., when the awareness is marginal.

In terms of this analysis, does it have meaning to say that the awareness can be distinguished from the organic reaction to the stimulus of blue? Obviously not, if the awareness is the awareness of that specific reaction. If the organism (retina, etc.) were not sensitive to the stimulus, there would not be awareness of something blue. Awareness, sensitiveness, is an inseparable aspect of the dynamics of the situation. It has no meaning to say that we can separate the awareness from the qualitative process, because without the awareness there would be no process. Sinclair may be right, therefore, in insisting that you can not "stick a knife edge" between the awareness of a qualitied object and the qualitied object. But this fact is no proof of epistemological idealism, for the object-stimulus does not depend upon *my* organism's being aware of it. Light can act upon an extra-organic camera which, within the limitations of technique, can give us the same pictures as our eye camera gives us directly. We then substitute the external camera's awareness for our organic awareness. But in neither case can we stick a knife edge between the awareness and the "object." I confess that I can see no meaning in Moore's statement that the awareness of blue and the awareness of red have awareness in common. He must think of awareness as adjectival, in some sense. At any rate it is something which he thinks he can distinguish as a separable factor in the sensing of blue or red. That appears to me to be a verbal confusion.

I suspect that the root of the difficulty lies in confusing awareness with interest. It is true that the color "blue" does not depend upon my interest in it. The color "blue" depends upon physical and physiological conditions, not upon my interest in it. My interest could not make it red rather than blue. Things, moreover, can shift from being part of my interest to being in the marginal field without ceasing to exist. The context of interest is only

one of many contexts in which things can exist. Things can exist in the broader fringe of awareness which is not at the moment part of my interest, as we have pointed out. Interest entails mnemic causation, which awareness does not necessarily do. Furthermore, things exist in various contexts of organic and physical awareness which can be reached only by inference from changes which are independent of our perceptual awareness, but must be interpolated to make intelligible the changes in our perceptual awareness. But everything in nature exists in some context. Nothing is indifferent. The argument [7] turns out, as Shakespeare would say, to be "much ado about nothing."

In a recent discussion [8] Moore distinguishes between blue things such as neckties and blue as a sense datum, of which an after-image is given as an example. Blue neckties are supposed to exist, like the moon, whether anyone is aware of them or not. I should agree that neckties and the moon exist whether for the moment I am aware of them or not. But what difference does it make to the neckties or the moon that I am sensibly aware of them? Would the necktie be blue or the moon golden if they are not sensed by my organism? Take the example of the moon. I know that the moon exists when it is covered by clouds, because it still has the same effect on tides whether it is covered by clouds or not. But has it any meaning to say that it still possesses the golden color when no organism is sensibly aware of it? Science would say no. The golden color is created in the relation of the moon to the organism. And the awareness is inseparable from my sensing it. What the moon is when it makes no sensible difference is a problem for physics, which takes account of other contexts than the sensible contexts.

But suppose I have an after-image of the moon's color. Does the after-image depend upon my awareness of it? The after-image is my awareness of the persistence of changes in the retina after I close my eyes. It is no more subjective than the changes produced directly by the moon's light. My awareness does not constitute the retinal field which I observe. It does not make the field yellow. If my brain is not aware of the retinal changes, if they fall below the threshold of the brain's awareness, there would be no *sensible* changes. (That is tautology.) The difference between the sensible changes when I observe the moon's color directly and when I observe the persistent changes in the retina with my eyes closed is a difference in the physical situation. The problem is not one that can be solved by verbal dialectic, such as Moore's, but by scientific

[7] The argument is G. E. Moore's "Refutation of Idealism," *Philosophical Studies*, Harcourt Brace & Co., 1922, pp. 16 ff.

[8] *The Philosophy of G. E. Moore*, 1942, pp. 653–660.

analysis. Moore's sense datum is a fiction. It has no existence except in a physical context from which it is an abstraction. To talk of tasting a taste is plain nonsense. When we taste we taste something, though, of course, we can verbally abstract the tasting as an operation from the integral situation. The upshot of the discussion is that consciousness is not a substantive, in the sense of a container; it is not an adjective that conscious processes have in common. It is not something in addition to the process of sensing, for the process could not exist without it. It is not *a* relation, but without it there could be no dynamic relation. For a dynamic relation means precisely sensitiveness of the parts of nature to one another in definite spatial and temporal ways. One of those ways is the sensing of nature by our organism. It has been said that consciousness is a neutral light, but that is defining by metaphor. Consciousness is not light and there is no neutral light. Just because consciousness is an ultimate aspect, it is indefinable. We can define different conscious processes and we can define different levels of conscious process, but we can not define consciousness.

I have, I think, established greater clarity and eliminated many confusions. In the dynamic relation of our organism with nature, awareness figures as an aspect of sensing, a very complex process, which must be distinguished from knowing and other kinds of meaningful reactions which necessarily involve mnemic causation. I have shown that it has meaning to say that there is awareness both in the reactions in extra-organic nature and in our organic reactions, independently of mnemic causation, though, of course, it is implied in the more complex reactions which involve mnemic causation. To make the term "consciousness" thus precise will, of course, rob it of a great deal of the charm that the vague usage has furnished for many philosophers, especially when Consciousness is spelled with a capital "C." But we should be willing to make some sacrifice in the interest of science.

The type of fiction which is the most insidious today in metaphysics is mathematical fictions. I have no quarrel with the mathematicians. They are delightful people, and they play a fascinating game. They have no interest, as mathematicians, in metaphysical quarrels. As C. S. Peirce, who was both a mathematician and a philosopher, says: "All mathematicians now see clearly that mathematics is only busied about *purely hypothetical questions*. As for what the truth of existence may be the mathematician does not (*qua* mathematician) care a straw."[9] But Peirce saw the danger of mathematicians claiming authority in other fields, a very com-

[9] *The Philosophy of Peirce*, ed. Justus Buchler, 1940, p. 45.

mon thing in our society: "We have seen how success in mathematics would necessarily create a confidence altogether unfounded in man's power of eliciting truth by inward meditation without any aid from experience."[10] The prestige of a Newton or an Einstein may lead to undue importance being attached to their statements about theology or philosophy where they are, after all, laymen. But mathematicians, as mathematicians, understand that "mathematics studies what is and what is not logically possible without making itself responsible for actual existence."[11]

My quarrel is with mathematicizing philosophers who confuse the fictions, altogether legitimate in mathematics, with physics or metaphysics. The tendency, no doubt, goes far back in Western thought. The Pythagoreans made a great discovery when they found that numbers are relevant to nature, but owing to the excusable inability to deal with abstract concepts in the first half of the fifth century B. C. (before the concept was discovered), they thought of numbers as physical things and compounded the world from numbers. Plato, in the *Republic*,[12] saw clearly the hypothetical character of mathematics as distinguished from metaphysics or the dialectic of reality. But in his old age he may have become somewhat confused, though his dialogues, extending up to his very death, are singularly free from this confusion; and Aristotle is an unsympathetic reporter on the subject. We have to come down to Descartes and Leibniz, both distinguished mathematicians, as well as philosophers, before we see the real tragedy of mathematicizing nature.

Descartes was the first to attempt (long before Einstein) to geometrize nature on a grand scale. In his early work, *Rules for the Direction of the Mind*, he develops an *a priori* deductive method. He holds with Plato that we know only by the mind and he has no doubt that the mind can deduce any of the causes and effects in nature. But by the time he wrote the *Discourse on Method*, he confesses that, while any particular effect is "capable of being deduced in many different modes from the principles . . . , my greatest difficulty usually is to discover in which of these modes the effect is dependent upon them." From this difficulty he found that he could not extricate himself except by "seeking certain experiments, which may be such that their result is not the same, if it is in the one of these modes that we must explain it, as it would be if it were to be explained in the other."[13] It is only fair to

[10] *Ibid.*, p. 46.
[11] *Ibid.*, p. 60.
[12] End of Book VI.
[13] *Discourse on Method*, John Veitch's trans., 1899, Part VI, p. 63.

give this concession to experiment by Descartes, who so largely relies on the deductive method. Experiment and observation enable us to decide between alternative hypotheses. Einstein did not rely entirely on mathematical deduction. He appealed to observation to decide between his hypothesis and Newton's. It is interesting to note the close resemblance between Einstein's method and Descartes'. Both agree with Plato that we know only by the mind.

Descartes was able to geometrize nature because he erected extension into a substance. According to Descartes, God created two secondary substances, thought and extension. After having created them, however, he "did nothing more than lend his ordinary concurrence to nature and allow her to act in accordance with the laws which he had established."[14] These laws we can deduce by reason. Descartes understands by extension the mathematical fiction of extension. Thus he is able to proceed by Euclidean geometry. Since extension and matter for Descartes are the same, matter being merely figures of extension, matter is infinitely divisible. This conception of matter has been used to discredit matter. The critics have maintained that what is infinitely divisible can not be real. But it does not follow that what is extended is infinitely divisible, unless you accept Euclid's mathematical fiction of extension. Other geometries have been constructed, since Descartes, in which extension is conceived as variously curved, negatively or positively. Extension, in fact, is an adjective of things in nature, and has various curvatures, changing under varying conditions. A universal homogeneous extension is a fiction in a certain type of geometry.

Leibniz denied the reality of extension altogether. It is, for him, merely a confused mode of perception. The real world consists of monads, soul-points, which have no more extension than a mathematical point. But Leibniz mathematicizes nature no less than Descartes. As one of the authors of the differential calculus, he sees in the principle of continuity a key to nature. He is impressed with Aristotle's gradations of nature. Aristotle had indicated empirically certain grades. But Leibniz pays no attention to empirical evidence. Between any two monads in the series of gradations, he conceives an infinite number of monads. This is, of course, mere fiction, but has been treated with respect, because Leibniz was a great mathematician. Leibniz was at a disadvantage because he had no lower limit to his series of gradations. For Aristotle and Plotinus, primitive matter, dark and unformed, furnished a natural lower limit. But Leibniz had abolished matter.

[14] *Ibid.*, Part V, p. 43.

Matter is merely a confused association of souls. Leibniz, like Descartes, has given us a world of fiction. In either case, we must acquit God of responsibility for such nonsense. Quantum mechanics is a recognition of the finite steps and relations in nature.

A. N. Whitehead, in his method of extensive abstraction, assumes, like Descartes, a general homogeneous extension and adds a general homogeneous duration, having in mind, I suppose, Newton's uniform flow of time. By introducing the conception of container and contained, he can show that any extension contains extensions and any duration contains durations. You can choose a smaller and smaller extension or duration within the larger extension or duration and thus derive the conception of a point or of an instant, which need not be infinitesimal but is merely the convenient stopping place in your division—different for different purposes. You can, then, hyphenate the point and the instant into point-instant, if you deal with measurements involving space-time. It is all very clear, if you start with certain abstractions of extension and duration. In fact, duration is no more a continuous, homogeneous entity than extension. Duration, like extension, is an adjective. In nature different processes have different durations, under varying conditions. Duration is just as Riemannian or variable as extension. In either case, a general extension or duration is a fiction. Whatever value Whitehead's method of extensive abstraction may have in mathematics, it has no relevance to metaphysics.

It is impossible to go into detail about the mathematical fictions which have found their way into physics and metaphysics. One of the outstanding fictions to-day is space-time as an entity in nature. Some physicists go so far as to say that physics deals with nothing but space-time. Now, space-time is a convention in the realm of measurement. In order to locate a moving body, like an airplane in flight, we require three measurements or numbers to determine its space relations and another type of measurement or number for stating its temporal relation. We may find it convenient to combine these measurements or numbers to describe moving things. But the numbers, after all, have significance only as symbols of relations in nature. When physicists say that physics deals with nothing but space-time, they substitute a method of manipulating the facts for the relations in nature which the physicist investigates. In scholastic language, they have confused the *ratio cognoscendi* with the *ratio existendi*. The same is true of Sir Arthur Eddington's statement that the only facts of physics are probabilities. The statistical method is an important tool for dealing with variations where large numbers are involved. But

the statistical method *aims* to deal with the real individual facts of nature and their changes. Equations, after all, are in the heads of scientists. They refer, presumably, to an objective situation.

The mathematical fictions have been particularly misleading in dealing with psychological facts. We are told that our psychological present is a matter of a fraction of a second to two or three seconds. This generalization is supposed to be based upon experiment. The experiments to which appeal has been made have been based upon attention. It is found that we can attend to a small black dot on a white screen (or vice versa) for only a fraction of a second before it goes out (and later comes back). What we are measuring in such a case is neural rhythm. A single neural process is quickly fatigued and as quickly resuscitated. But if the object of attention is complex, we can attend indefinitely. The duration of mental processes has no relation to attention. The stream of consciousness is not a single-file affair as attending is. It isn't a file at all but a gestalt of considerable complexity. Our sensory experiences have various durations irrespective of the limitation of attention. An emotion can last a long time and, as sentiment, it can last a lifetime. The mathematical conception of a specious present is a fiction. Our psychological processes are as Riemannian as our physical world. They have all kinds of duration, and those durations vary with conditions. How can you measure the duration of a meaning or a sentiment by a stop watch?

Whitehead's hypothesis of "inheritance" by one moment or "occasion" of a previous moment is based upon a fiction. The processes of nature, including our mental processes, are not divided into moments. There is the persisting field and the contingent changes in mental processes. The field is a time-whole which is a cumulative structure with its persistent theme and the variations, as in music. This whole is not divided into moments or "occasions" with "inheritance" from moment to moment. The time-whole is an indivisible unity which completes itself in shorter or longer durations whether it be a symphony or a purposive life. We can analyze this time-whole and distinguish the temporal structure and the novel occurrences which are assimilated into the structure, but we can not do this by the clock. We must all the while recognize the movement as a whole, if we are to understand or to appreciate it.

I would not say with Bergson that psychological processes persist always. According to Bergson, it is the brain that dams the flow of memories, making them travel single-file or not at all. Bergson has a good deal of evidence to show that memories persist even when unconscious to the ordinary observer, but it does not

follow that they always persist. He is right that mental processes are not reducible to molecular motions in the brain. Even if they are emergent, they are facts *sui generis* and have their own laws, though the basic mental processes are not memories but conations, giving rise to interest upon which memory depends. As for the brain blocking mental processes, it is true that disease and fatigue interfere with the flow of memory. But psychoanalysis shows that the real blocking is conational—conflict of emotions and desires. Bergson deserves credit for breaking away from the mathematical method of picturing our mental life. The durations of our mental processes are not determined by the clock.

A persistent fiction which has beset not only philosophy, but science generally, is that of atomizing nature into distinct and separately existing entities. We are apt to associate atomism with the physical sciences. And it is true that atomism has had a long career in the physical sciences. It started with Leucippus in the fifth century B.C. Leucippus and his better-known successor Democritus tried to show, and did show, that matter is discontinuous, as against Parmenides, who had tried to prove that nature is a physical continuum. The atomic hypothesis emphasized an important aspect and proved useful in modern chemistry, in spite of its one-sidedness. Its physical and metaphysical inadequacy was made manifest only when Faraday discovered the field. Since then it has been shown that whatever reality exists in the atomic conception is bound up with fields. The properties of matter are field properties. There are no absolute, separate entities such as the old atoms.

It is in the field of mental processes that atomicity has shown the most stubborn resistance. And it has today such distinguished proponents as Bertrand Russell. In philosophy, atomicity goes back to Aristotle, with his distinct and immutable essences. In this form it persisted through the Middle Ages and into modern philosophy, as I have already pointed out. But with the psychologizing of nature in the British empiricists, especially in Hume, atomism takes a new form. The atomism in philosophy today connects directly with Hume. The most explicit statement of atomism is given by Hume in the Appendix to *A Treatise on Human Nature:* "Whatever is distinct, is distinguishable, and whatever is distinguishable, is separable by thought or imagination. All perceptions are distinct. They are, therefore, distinguishable, and separable, and may be conceived as separately existent, and may exist separately, without any contradiction or absurdity." It should not be necessary to point out the logical fallacies in Hume's

statement. It does not follow that what is distinguishable is separable in any other sense than that it is distinguishable, which is tautology. It does not follow that what is distinguishable "may be conceived as separately existent." Hume sums up the result of his analysis at the end of the *Treatise:* "In short there are two principles which I cannot render consistent; nor is it in my power to renounce either of them, viz. *that all our distinct perceptions are distinct existences,* and *that the mind never perceives any real connection among distinct existences.*"

Hume started at the wrong end. Instead of starting with "separate existences" (and finding that, after having assumed them to be such, he could find "no real connection among distinct existences"), he should have started with the connections. This is what E. Mach did: "There is but one constancy which embraces all forms, namely the constancy of connexion (or of relation). The majority of the propositions of science express such constancies of connexion. 'The tadpole is metamorphosed into a frog; chlorate makes its appearance in the form of cubes. Rays of light are rectilinear. Bodies fall with an acceleration of 9.81 (m/sec. 2).' When these constancies are expressed in concepts we call them laws." [15] Mach follows in the footsteps of Heraclitus, who had long before shown that our only knowledge of nature is a knowledge of the order of transformations.

Hume had a long background for his fiction of separate existences. Hume calls them "perceptions," which include their fainter copies, the ideas. For Hume our experience is nothing but a rapid succession of separate pictures—perceptions and ideas. Hume was evidently a strong visualizer and could recall mostly visual pictures. Kinesthetic experiences have been largely ignored by Hume and his successors. They would have lent themselves less to fixation than visual perceptions and memories of tables and chairs. But Hume's supposed introspection of "impressions" and "ideas" is fictitious and the product of language. When we give a name to an "impression" or "perception," it takes on a substantival character. Words can be shuffled back and forth, though they have meaning only in a context.

It is certain that no one ever observes a separate "impression" or "idea." Physiologically the cerebrum acts as a field in which many processes interact. It does not act as separate neurons. Psychologically it acts as a gestalt. We do not start by perceiving separate elements, such as qualities, but we start by vaguely perceiving the situation as a whole, with its spatial, temporal, and causal relations. The statement of immediate awareness of causal

[15] *Analysis of Sensations,* trans. 1897, pp. 169 f.

relations will doubtless be challenged. But it is, at any rate, true of the movements of our own organism in so far as they are controlled by our volitions. And it is from this immediate consciousness of causality that we have a key to causality in nature, because we are part of nature. It is true that we can not follow in detail the relation between our volition to act and the changes in nerves and muscles. Neither can we follow in detail the chemical changes in the synthesis of H_2O. But we are guided by our macroscopic observations to arrange the conditions, and the changes follow. So in our desire to move our hand, we have a macroscopic consciousness of the changes and their conditions. And no sane man practically doubts the evidence. The microscopic analysis aims to clarify the macroscopic awareness, not to refute it.

We start with whole-situations; and the parts of the situation, when our interest distinguishes them, owe their significance to the context in which they exist. They are relative to the complexity and movement in the total situation, as the most elementary study of what we call "illusions" makes evident. But the relativity, of course, is just as real in what we take to be normal perception.

Physiologically and psychologically Hume's analysis has not a leg to stand on; and, logically, it is a mess. What I like about Hume is his honesty. He was caught in the toils of a false tradition—Malebranche's tradition from Augustine that the world is created new from instant to instant and that, therefore, there is no continuity in nature; and the atomistic tradition in psychology of separate sensations and ideas. It has taken several hundred years to clear up the confusion, and it is far from being cleared up in philosophy yet. I sympathize profoundly with Hume's melancholy, after living a while in this fictitious world, and his relief in returning to first-hand human relations and human activities, though it be but a game of backgammon. Perhaps it would have been a good thing if Hume had obeyed his impulse to throw his books and papers into the fire. But who of us would have done so? And it would have done no good, because the movement would have gone on, in any case, until new methods and discoveries could show its illusoriness. If Hume had started with our instinctive common-sense life in nature, instead of falling back upon it as a refuge, he would not have been obliged to confess failure.

These are some of the fictions or confusions that have beset the history of philosophy and science. Science, like a running stream, purifies itself. But in philosophy there have been stagnant pools for ages, and it is time that the current of criticism should set in. If not, there is no future for philosophy.

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BOOK REVIEW

The Growth of American Thought. MERLE CURTI. New York and London: Harper and Brothers. 1943. xx + 848 pp. $5.00. (School edition, $3.75.)

The need for a new history of American thought has long been recognized. Since the appearance of *The Cambridge History of American Literature* between 1917 and 1921 and the publication of Parrington's *Main Currents in American Thought* ten years later, hundreds of monographic studies on American subjects have been published, presenting much new material and calling for new evaluations. Moreover, historical perspectives quickly change and what seemed clear and significant to the historian of the 'twenties may no longer seem clear or significant to the historian of the 'forties. Accordingly, when it was announced a year or so ago that a new history was being prepared by Professor Curti, students in the American field awaited its publication with great interest. In view of Professor Curti's prestige as one of the ablest of the younger American historians, it was hoped that he would succeed in doing for the entire sweep of American intellectual developments what Gabriel had done so exceedingly well for the period of the nineteenth century.

The book itself, now that it is in print, neither fully justifies nor completely disappoints these earlier expectations. It is generous in scope, being concerned not only with the growth of knowledge, speculation, and the more basic cultural institutions such as schools, libraries, foundations, and the like, but also with the social and physical factors conditioning their development; while to the task of filling this larger canvas in, Professor Curti brings the same erudition, the same capacity for disinterested judgment, and the same scrupulous regard for documentation for which his work has been noteworthy in the past. If he lacks the literary brilliance and contagious enthusiasm of Parrington, he is also free of Parrington's partisan spirit; and if he does not always throw new light on old questions, he at least provides the reader with an overwhelming array of facts, names, and dates, derived from a wide variety of sources. Thus his bibliography alone—in itself an extremely useful guide—occupies more than sixty closely printed pages. The volume, in short, is one which many will criticize in detail but also one which all students will find helpful in some form.

For convenience, Professor Curti divides American intellectual history into seven phases, which overlap to some extent but are

clearly distinguishable: (1) the colonial period, which he interprets as one primarily concerned with the adaptation of the European heritage to American physical and social conditions, and which, in the rise of the Enlightenment, laid the basis for the ensuing revolutionary period; (2) the revolutionary period itself (1765–1800), characterized intellectually by the emerging concept of "Americanism," and by the fulfillment of the Enlightenment in the spread of deism, Unitarianism, and humanitarian reforms; (3) the period, 1800–1830, which witnessed the temporary triumph of the old "aristocratic" conception of art, literature, and science in their relation to society and which also witnessed the deepening of the conflict between the tendencies toward cultural nationalism and cultural cosmopolitanism; (4) the period of the great democratic upheaval between 1830 and 1850, which was marked intellectually by the new equalitarianism of the frontier and the romantic sentimentalization of the common man, by the strides forward in public education, and by the continued advance of science and technology—the latter movement still deriving its impetus from the past but now becoming increasingly associated with the solution of social problems; (5) the Civil War period (1850–1870), in which the most salient influence brought to bear upon the life of the mind was the new industrial nationalism, created in part by the war itself, and leading, among other things, to the reconception of the state in naturalistic rather than contractual terms, and to the domination of schools, colleges, and education generally by the new industrial leadership; (6) the period, 1870–1900, which was distinguished in the technological sphere by the growing subordination of science to the needs of the industrial process, in the social sphere by a rampant laissez-faire capitalism, and in the intellectual sphere by the rise of evolutionism and pragmatism, by the decline of supernaturalism, and by the proliferation of ideologies specifically designed to defend, correct, or eliminate the capitalistic system; and, finally, (7) the period of the twentieth century, which on Professor Curti's reading is most notable for its trend away from the traditional political isolationism as well as for its recurrent cycles of depression and prosperity and the literature of protest and criticism to which these cycles have given rise.

Even from the above crude summary it should be apparent that Professor Curti has not approached his task with any special bias in mind. In particular, he is free of the frequently encountered tendency to discriminate against the more popular expressions of culture or to be guilty of oversimplification in seeking the causes of intellectual growth. Thus he places as great an emphasis upon

the attitudes of the common man as he does upon the ideals and beliefs of the educated, and gives as much, if not more, attention to the less pretentious vehicles of culture (the newspaper, the almanac the pulp magazine, the public school, museum, and library) as he does to the more sophisticated cultural agencies of the university, the research foundation, and the great private libraries and art collections.

Similarly, his approach to this material is pluralistic and empirical rather than monistic or *a priori*. There is no "thesis" which he deliberately sets out to sustain, and whatever unity his account exhibits is derived largely from the material itself. For example, although he attributes considerable weight to the conditioning influence of political and economic factors and finds that our intellectual development has on the whole paralleled our institutional development, he is far from assuming that this parallelism is invariable or that it is the institutional element alone which has been efficacious. If I understand him correctly, he is willing to attach as much importance to the inherent tendency toward growth and interaction on the part of ideas and ideals themselves as he is to the rôle of such extrinsic factors as the physical terrain, the expansion of industry, and the impact of the European immigration. In other words, as he depicts the interplay of these various forces, art, religion, and science are seen not only as being affected by, but as themselves affecting, the purely economic development.

But if no serious objections can thus be taken to Professor Curti's general interpretation, the same claim can not be made regarding the historiographic framework within which that interpretation proceeds. On the plea of limited space, he focuses his interest exclusively upon what he calls the "social history of American thought," that is, upon the relationship between intellectual life and other phases of American civilization; and on the same plea rules out of consideration not only a careful analysis of the ideas and systems with which he is concerned but also a full discussion of the history of separate intellectual disciplines. And this deliberate delimitation of his subject has many disadvantages. It leads him, in the first place, to disregard generally the need for clarity in the definition of basic terms and thus also to introduce an element of obscurity which might easily have been avoided. For example, he defines "nationalism" merely as "a general term for intertangled sentiments, ideas, and interests" (p. 253), and "romanticism" as a "generous catchall" (p. 238); and although he discusses these terms subsequently at greater length, their initial

ambiguity remains, since his discussion itself is particularistic rather than general in character.

Again, this procedure leads him to neglect important areas of culture which a history of thought might legitimately be expected to include. Thus, important schools of thought in philosophy, theology, and other fields are often mentioned only by name or, if discussed at all, dismissed in one or two sentences. This is particularly true in his discussion of art. Although reference to the arts is not wholly lacking, the consideration of such significant groups as the eighteenth-century portraitists, the Hudson River school, and others is entirely brief and casual, with little or no interest displayed in examining these groups in detail either for themselves or for what light they may be able to throw on other aspects of the culture of their time.

Most dubious of all, however, is the underlying assumption that even a purely "social" history of American thought can dispense with the rigorous analysis of ideas. No style of writing, no point of view, no work of art is ever sufficiently explained by merely noting the fact of its occurrence. Unless we can lay bare its inner structure and meaning or—to use Professor Curti's own word—penetrate its "interior," neither it nor its social significance can be precisely charted. Like any complex event whatsoever its component parts must be isolated before the exact character of its causal relationships with other events can be fully exhibited, and unless the historian of thought is prepared to do this, his account will rarely rise above the level of the commonplace. And Professor Curti's history suffers precisely in this regard. Although he is never guilty of gross banality, there is a familiar ring to much of what he has to say, while his text itself often approximates the form of a syllabus, a syllabus which is accurate enough so far as names, dates, and places are concerned but is disappointingly lacking in the element of interpretation.

But with all of its limitations, the book, as indicated earlier, remains a useful one. Its excellent bibliographies, its careful marshaling of evidence, and, above all, its sheer success in bringing together within a single outline a vast array of hitherto unrelated facts render it a valuable contribution to American studies. It is to be regretted only that having carried his investigations thus far Professor Curti chose to stop short of producing that kind of history of which his writings in the past have proved him fully capable.

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BOOK NOTES

In Praise of Wisdom. JACOB KLATZKIN. Translated from the Hebrew by A. Ragelson. New York: L. B. Fischer Publishing Corp. 1943. 312 pp. $3.50.

The caustic, penetrating comments scattered plentifully through this book suggest a kind of cross between Emerson and Nietzsche. A background of mysticism makes them even more pointed, by a kind of *haut-relief*. But there is nothing romantic or sentimental even in the mysticism. Reason concedes nothing to the Great Profound. Rather, it rises up in its own strength to challenge it with: "See, I discover my own limitations. *You* teach me nothing." There is an Aristotelian high-mindedness in its humility.

But the author is even more convincing (as are Emerson and Nietzsche) when simply making observations on human motives and conduct. The "wisdom" which is being praised (and exhibited) in these pages is least alloyed in this connection. Following are some samples of interest to academicians:

> If you wish to attack certain ills in . . . the realm of literature and to have those ills corrected, be very careful that your statements should not be so universal and lofty . . . that they will never touch real persons. Else you will find those very literary men whom you meant to disparage applying your disparagements to their colleagues. . . . They will even take honor in the supposed dishonor of their fellows. [P. 156.]

The truly great intellects and saintly souls

> seek a refuge in matters and affairs utterly at variance with their essential selves, for instance, in jesting and scoffing, even . . . in foulmouthedness . . . they would flee their burden of Divinity . . . they strive hard for self-profanation—and remain as pure and saintly as ever. Conversely, the mediocre and dwarfish natures . . . *seek after God,* chase him indefatigably—and never overtake him. [P. 286.]

> Sultans and viziers, fearful for their hidden treasures, appoint miserable eunuchs to guard their wives. So also, one finds among men of intellect suspicious misers of that sort: artists, scientists, metaphysicians and moralists, who surround themselves with miserable company, groups of small-brained pupils and disciples, and thus set up spiritual eunuchs as guardians of their treasure. Followers and admirers of this kind are certain not to understand creative wealth; hence, they are not under suspicion of making competitive use of it. Is not this a manner of instinctive cleverness among creative ones? [P. 292.]

The book divides into three parts: "Life Microscoped," "Psychological Essays," and "Aphorisms." Under the first title appear one hundred and fifty-four comments on just about everything that taxes a man's "wisdom" in the appraisal. Fifty short essays comparable to the comments in substance and tone appear

under the second title, and a short section given to aphorisms (the weakest part) concludes the book. If the original Hebrew is as good as the translation, the author has reason to congratulate himself—on his own style and on having found such a competent translator. He (the author) is editor of the *Encyclopedia Judaica*.

V. C. A.

Art and Poetry. JACQUES MARITAIN. Translated by Elva de Pue Matthews. New York: The Philosophical Library. 1943. 104 pp. $1.75.

The essays and reflections which comprise this volume were written at various times between 1924 and 1935. They first appeared as *Frontières de la Poésie*, published in 1938; but the title essay of that volume is omitted from the present translation, since an English version of it has appeared previously among the supplementary essays included in *Art and Scholasticism*.

Maritain speaks partly as a philosopher and partly as a sympathetic commentator on art and artists. The first chapter contains short studies, largely of an appreciative character, of Chagall, Rouault, and Severini. The essay on Rouault is skillful in presenting, in eight brief pages, both a factual biographical sketch and a subtle portrait of a character. The second chapter consists of detached, independent paragraphs, epigrammatic in style, presenting the writer's passing reflections on "Parisian conversations and controversies" of the 'twenties. There are references to Gide, Mauriac, Cocteau, and some others. The third chapter deals mainly with music. Its varied import can be instanced, though imperfectly, by the remarks on "magic," which the author finds in the compositions of Arthur Lourié. There is "magic" in music "when the spirit transcends the soul, is in a way separate from it . . . and when the soul and body . . . become together . . . the *instruments* of an alien spirit, a sign through which passes a superior causality." Although "magic" lends itself to great art, it is not indispensable to it; nor can it consciously be acquired, for "he who seeks it inevitably alters his art, fabricates counterfeit money." Bach and Beethoven achieved greatness without seeking or needing it; Wagner, who "lived only for magic," attained no more than "the frauds and drugs of a head drunk with science and genius"; but there is much magic "in Schubert, in Chopin, in Moussorgsky."

The book depends so intimately on its nuances of style, which seem excellently retained in the translation, that no summary can do it justice; and it is often so nearly impressionistic that any literal-minded dissent from its doctrines would mark only the

critic's capacity for irrelevance. Perhaps many readers will find it perplexing, with artistic insights more hindered than helped by the underlying philosophy. Yet no reader, having freely lent himself to these fragments of Maritain's thought, can fail to recognize in them a manifestation of exceptional refinement and sensibility.

C. L. S.

Society and Ideology: An Inquiry into the Sociology of Knowledge. GERARD L. DEGRÉ. New York: Privately printed. Distributed by Columbia University Bookstore. 1943. iv + 114 pp.

Dr. DeGré's book shows that the field formerly called "the history of ideas" is acquiring the dignity of a science, chiefly through the acquisition of a technical language. In the historical section of his book he goes back to the modern sources of some of the key concepts of the sociology of knowledge, to Nietzsche, Scheler, Pareto, Durkheim, and others, and shows how the concepts these men formulated (resentment, residue, derivative, sociological determination, and others) functioned in their own systems, what their limitations are, and how they might be restated more precisely in the sociology of knowledge.

In the last chapter of the book, Dr. DeGré assembles the various key terms that he has discussed separately and suggests the general outlines of a theory under which this type of investigation can be carried on. Social activity (including the communication of knowledge) is determined, he claims (in a more precise technical language), by the impact of the outlook (emotional, rational, and ethical) of the individual on his environment (social and physical). The value of this type of investigation appears when this general approach is applied to specific beliefs. Dr. DeGré emphasizes the fact that such a sociological investigation, though it has a validity of its own, is not to be confused with the attempt to discover the validity of the beliefs under examination.

Dr. DeGré's book is useful in that it shows how varied are the sources of this new discipline and in its attempt to discriminate sharply the various kinds of problems that have been lumped together under the sociology of knowledge.

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Hinduism and Buddhism. ANANDA K. COOMARASWAMY. New York: Philosophical Library. 1943. 86 pp. $1.75.

In this book Hinduism and Buddhism are regarded as the religions that nobody—or perhaps only a select few—knows. In in-

troducing Hinduism the author says that "it would be hardly an exaggeration to say that a faithful account of Hinduism might well be given in the form of a categorical denial of most of the statements that have been made about it." In introducing Buddhism he remarks, "We can only suppose that Buddhism has been so much admired mainly for what it is not." He then proceeds to make them known.

The writer takes the Hinduism and Buddhism "of the texts as they stand" and presents what he believes is the orthodox view "never employing words of our own or making any affirmation for which authority could not be cited." Mr. Coomaraswamy has produced a study which seems to the reviewer to be typically Indian in its conclusions and as such should interest Western philosophers. At a time when Western thinkers are generally trying to define, distinguish, and differentiate between things it may come as a surprise to find a scholar energetically smoothing over differences, breaking down distinguishing patterns, hazing over lines of opposition, and making things going in opposite directions seem to go in the same direction. The Indian mind seems capable of doing this with no sense of strain—perhaps because to the Indian the various religions or philosophic expressions with their various ways of salvation are different ways of saying the same thing. The *Bhagavad Gītā* itself, probably the most important single work ever produced in India, has within itself, without sense of clash, various ways of life and salvation.

Thus, by a careful use of the texts Coomaraswamy arrives at the conclusion that it is difficult if not impossible to distinguish Buddhism from Hinduism. In fact he even arrives at the interesting conclusion "that the Buddha is Brahma, Prajāpati, . . . the First Principle." Scarcely taking breath he exclaims that the logic of the scriptures forces us to say that "Agnendrau, Buddha, Krishna, Moses and Christ are names of one and the same 'descent' whose birth is eternal." To a Westerner this turning of all colors to gray is the neatest trick of the week—especially when it is done with footnotes and not mirrors. But to an Indian it is natural and proper and represents the intelligent point of view. This book is recommended to Western philosophers who would like to have, in narrow compass, a scholarly sample of the Indian mind at work.

K. P. L.

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